# *A Framework for Action:*
# Improving Quality and Productivity in Government and Industry

*Report from NASA Symposium on Quality and Productivity*

NASA
National Aeronautics and Space Administration

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*Report from NASA Symposium on Quality and Productivity*

*The Office of NASA Productivity Programs*

**December 1984**

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## *Message from the NASA Administrator*

To ensure that the National Aeronautics and Space Administration continues to be a highly productive and quality conscious agency, we have made it one of our highest goals to be a leader in the development and application of practices which contribute to high quality and productivity.

Technology represents America's greatest competitive strength. As a leader in research and development efforts for more than a quarter of a century, NASA has helped keep America on the cutting edge of technology. We need to build on this solid technology base and maintain our competitive position.

Management must direct its attention to strategies that enable us to develop world-class organizations. We must continue to increase productivity to improve our relative position in the world market and maintain our standard of living. Quality goals must become an integral part of all organizational activities. As President Reagan has said, "Following the example of our forebears, we need to rely on basics, yet dare to dream, always remembering that there is no substitute for quality."

I strongly endorse the recommendations contained in this report, both for NASA and as a framework for action to help individuals realize their greatest potential and for organizations to increase their effectiveness. It is my hope that you will read this report carefully and use those ideas and management concepts which are of value to your organization.

**James M. Beggs**
December 1984

## *Foreword*

On September 25-26, 1984, NASA sponsored the "Symposium on Quality and Productivity: Strategies to Improve Operations in Government and Industry." More than 650 top executives attended from more than 110 corporations, 35 government agencies, and 20 universities. The 36 speakers were high level leaders from some of the most successful organizations in the United States. The focus was largely on white collar quality and productivity. This report summarizes the general conclusions reached at the symposium.

An underlying conclusion of the symposium was that large, maturing organizations have a particular challenge to maintain high levels of quality and productivity, and guard against "hardening of the arteries." Without overt management action to continually renew and respark its drive, these organizations would eventually go out of business. Competitive pressures from abroad have crystallized these issues for many U.S. industries. For those who have not been directly challenged in the marketplace, the lessons learned are readily translatable into management imperatives. Although government organizations do not face that kind of competition, there is a distinct need to continuously rekindle their performance.

The report contains no "magic" formula for success or "quick fixes" for poor quality or low productivity growth. On the contrary, it stresses commitment to long-term strategies and a balancing with short-term bottom line results. It presents key underlying principles which, when implemented, can lead to continuous improvements in quality and performance. These principles should be viewed as techniques for regenerating an organization's vitality and, therefore, its prospects for continued success.

David Braunstein

**David R. Braunstein**
*Director*
*NASA Productivity Programs*
December 1984

## *Executive Summary*

A new worldwide standard of quality has evolved and we cannot ignore its impact on our competitive position in the global marketplace. The challenge is to maintain our standing as a world economic leader. We must look at our management practices and determine what makes the difference between success or failure. This difference is often the way an organization brings out the great energies of its employees *and* sustains them from one generation to another.

The major findings of the symposium are organized into nine themes that build on this thought. Each encompasses a set of recommended actions and management practices that have been shown to contribute to high quality and productivity. Briefly stated, they are:

**THEME 1:**
***Challenge for the Competitive Edge: Responding to Competitive Pressures.***

The worldwide market competition we face as a nation and its impact on our organizations presents a serious threat. Eighty percent of our products are now challenged in the marketplace, compared to 20 percent ten years ago. A continuous quest for improvement, greater cooperation and trust, and a world-class standard needs to be built into organizational philosophies. All employees should understand the nature of the challenge. Management needs to convey the message and generate pressure for improvement.

**THEME 2:**
***Make a Management Commitment to Quality and Productivity: Leading from the Top.***

Quality and productivity are the responsibility of top management. Too often, however, they are assigned to staff with a "fix it if it goes wrong" mentality. As a result, they become buzz word goals rather than measurable objectives for which line managers are held accountable. Management involvement is meaningless unless demonstrated commitment is perceived by employees as genuine and long-range.

**THEME 3:**
***Mesh Goals and Responsibilities: Opening Two-Way Communications.***

A clearly articulated management philosophy can guide managers to speak and act honestly and confidently with customers and suppliers. To earn the support of all employees, management must communicate the goals and objectives of the organization. A clear, long-term management philosophy provides a sense of direction. On a broader level, government, industry and labor unions need to be less adversarial.

**THEME 4:**
***Make Innovation Rewarding: Encouraging Innovation and Risk-Taking.***

Maintaining the creativity and risk-taking attitude that make an organization successful is a major task of maturing organizations. It is well known that innovation is key to organizational survival in a fast changing economy. The true risk for any organization is to believe risk-taking is unnecessary for long-term survival. Management needs to recognize the proper place for innovation and risk-taking and create an environment that supports and rewards it.

Successful organizations have a very high level of performance "over and above" that expected from its employees. Management needs to encourage and provide positive support for employee participation to maintain organization vigor. Middle management anxieties need to be addressed in this process, and mechanisms such as employee suggestion programs and quality circles should be used to sustain high levels of employee participation, so that employees feel committed and involved in the organization's success.

**THEME 5:**
***Build Dedication, Pride and Team Effort: Promoting Participative Management.***

As successful organizations mature, they tend to become preoccupied with controls and checks that are narrowly focused, parochial and inflexible. This process results in overregulation of activity, discourages initiative and slows down responsiveness to changing conditions. Management needs to thwart this tendency through decentralization and by providing freedom and protection for its innovators. Pushing responsibility to the lowest levels of an organization is the best way to make entrepreneurism a reality.

**THEME 6:**
***Uncork Individual Talent: Controlling Bureaucracy.***

Being a leader in research and development has been the key to keeping America competitive and in the forefront of technology. Although modernization involving new equipment and techniques is often difficult to justify on a return-on-investment criterion, management needs to have a philosophy that encourages new technology. Management also needs to have training plans for introducing new technology, to lessen the social impact on individuals.

**THEME 7:**
***Modernize for Survival: Encouraging New Technology.***

Basic to productivity is education and training; it defines and develops the quality of human resources for the future. We have fallen behind in educational achievements and in the number of engineers graduating on a per capita basis. Improvement in national productivity and competitiveness depends on new strategies for the training, education and social conditioning of our most important natural resources—our people.

**THEME 8:**
***Maximize Human Capital: Developing Strategies to Improve Education and Training.***

High quality goes hand in hand with high productivity. In many organizations, total defect costs range from 15 to 40 percent of budgets. For maximum organizational effectiveness, continuous improvement goals are needed and must have total commitment by management. Every function has customer and quality objectives that have to be translated into specifics that are meaningful to each organizational effort. All levels of management must assess organizational activities and processes on the basis of their impact on quality and productivity—not just on bottom-line results.

**THEME 9:**
***Improve Quality and Productivity Practices: Building a Quality Ethic.***

## *Introduction*

The United States has been the world leader in advanced technology for the last 50 years. Today, however, our economy faces stiff international competition. The dominant position we enjoyed in the world economy since World War II could only be temporary.

> "America's problem in recent years is that the climb to the top had been so easy we had come to take our economic leadership for granted. It was not hard to maintain leadership in world markets when there were few, if any, competitors." (James M. Beggs, NASA)

Ultimately, the relative position of the United States in the world economy will depend on the actions taken in individual organizations, by individual managers all across the nation. Thus, the audience for this report is that important group of leaders and managers in industry, government, education and labor who must work individually and collectively to meet the competitive challenge. Because of the large and growing white collar population in the work force (NASA's white collar costs are over 80 percent of its budget), we have concentrated on this area.

> "We must recognize that quality is not just for the factory. In the aerospace and defense industry, approximately two-thirds of our people and our costs are non-manufacturing related. We need to address quality in engineering, administration and other disciplines as well as within our factory operations. And, we must share what we've learned with our suppliers and sub-contractors, because their quality has an impact on our productivity, too." (R. J. Boyle, Honeywell, Inc.)

How do we respond to the challenge of international competition? We need to learn what we have done right and build on our successes. This requires that we analyze our strengths as well as our weaknesses.

Richard Foxen of Rockwell International Corporation states that our single strongest competitive element is the flexibility and adaptability of the American work force—both workers and managers. The quality of our human resources is high. Due to their social mobility and exposure to an advanced and widely accessible educational system, our people have a strong entrepreneurial spirit relative to other countries. Foxen further states that we have incomparable advantages over other nations in our pool of basic science, the depth and breadth of our industrial infrastructure and our flexibility for capital development. In addition, we possess the world's largest market with a common language, and our dollar has a central role in the international monetary system.

Despite these strengths, however, we have record trade deficits and American manufactured products no longer define the world standard for quality. We have lost dominance in many key industries, such as steel, autos, machine tools, and consumer electronics. Our investment in research and development as a percentage of the Gross National Product has waned, while in other major industrialized nations, it has increased. Our annual productivity growth rate lags behind that of Japan, West Germany and France. And as Robert Cole of the University of Michigan pointed out, this is not so much because the quality of U.S. products has declined—for the most part it has not—but that the quality of Japanese and German products has risen much more rapidly.

If this trend is allowed to continue, our nation will pay a heavy price in terms of lost jobs and decreased living standards. To respond to the challenges of foreign competition and to maintain American leadership in the world economy, we must focus on efforts that have long-term impact on quality and productivity. This requires reinforcing management practices that strengthen our long-term ability to be competitive. As Richard Kraft of Matsushita Industrial Company said:

> "Management thinking guided by this philosophy tends to focus on a continuous activity to improve the product and the process and to upgrade the people rather than to focus on activity to achieve an improved P and L by accounting manipulation, tax adjustment activities, legal maneuvers, and other activities which can positively impact short-term results but add little substance to the business for long-term success."

The following themes represent both a synopsis and synthesis of the issues discussed and the ideas, examples and recommendations offered at the NASA symposium. Each begins with a brief overview of the need for action, followed by a series of recommendations and illustrations on what organizations can and are doing to meet the challenge.

**THEME 1.**

## *Challenge for the Competitive Edge: Responding to Competitive Pressures*

"Being competitive today is a matter of what the whole society does: it is government, managers, employees, unions, educational institutions, consumers and taxpayers. . . all together, all part of the action." (Ruben Mettler, TRW, as quoted by Malcolm Stamper, The Boeing Company)

Whether they realize it or not, virtually all U.S. organizations are operating in a world economy. There is hardly a U.S. market that does not have at least 20 percent foreign penetration, and in some markets it runs as high as 80 percent. At the same time, our dependence on international markets is increasing. The message is clear: U.S. firms cannot continue to do business as they have in the past. Even high technology is not immune and must adapt, adjust and change in order to survive.

"Surprisingly to many, in the last decade even our share of world exports of high technology products has declined from 25 to 20 percent. And the U.S. share of world trade in such services as insurance, finance, aviation, shipping and engineering also has declined from 25 to 20 percent." (Richard Foxen, Rockwell International Corporation)

**Richard W. Foxen**
*Rockwell International Corporation*

### Recommendation 1.1 Recognize Foreign Quality/Productivity Gains

During the late '60s and early '70s the U.S. industrial base began to lose ground as Japan, West Germany and other industrialized nations cut into our industrial competitive edge. Robert Cole of the University of Michigan summarized the problem this way:

"Suffice it to say that increasingly, our products have become less competitive worldwide and domestically when it comes to price, quality, and even product innovation."

Egils Milbergs, Executive Director of the President's Commission on Industrial Competitiveness, suggests that the U.S. public and private sectors "are beginning to define a uniquely American response to the competitive challenges we face."

"Perhaps the most difficult, yet in some ways the most important, action is to take immediate steps to educate both our management and our work force regarding the significance of this globally interdependent environment." (Foxen)

Foxen points out that we need to understand:

- The U.S. share of world auto markets has declined from 32 to 21 percent, and from 19 to 10 percent for steel.
- In 1960, only 5 percent of our Gross National Product depended on foreign trade; today it is over 14 percent.
- Exports create a large demand for employment. Between 1977 and 1980, 30 percent of the increase in private sector employment was attributable to export growth.
- The more a company invests abroad, the greater its exports and employment at home.

**Egils Milbergs**
*President's Commission on Industrial Competitiveness*

These kinds of facts challenge many of the prevailing myths in our society regarding international trade and overseas investment. Before we can build a consensus for action among managers, labor unions and employees, we must examine these facts and develop a common understanding of the global challenge. Awareness precedes action. All employees must be made aware of the need to become a world-class competitor in order to survive. In addition, we must develop more effective management approaches to organizational activity even in those organizations which are not directly challenged.

**William G. Ouchi**
*The University of California at Los Angeles*

### Recommendation 1.2 Use Consensus-Building in U.S. Societal Groups

When decisions are primarily reserved for "top" management, we tend to find large staffs, bottlenecks and stifled initiative. Based on organizational research, William Ouchi of UCLA has concluded that in the long run, the high performing type of company is the M-Form or multi-divisional organization. This organizational form addresses a major impediment to productivity—the ability to confront different points of view and reach a consensus on future directions at the lowest practical level. Consensus building encompasses cooperation, informal discussions, and better coordination.

When the M-Form organization succeeds, it has achieved a balance between competition and teamwork. The organization is decentralized in the sense that each division operates as if it were a small entrepreneurial business, to encourage flexibility and creativity.

Ouchi argues that this principle can also be extrapolated to the national level and even to societies:

> "The basic building blocks are in place...the American Business Conference, the Conference Board, National Association of Manufacturers, Chamber of Commerce...They ought to be linked to one another..."

He points out that we need similar mechanisms in labor, municipalities and states, and civic and consumer groups. Mechanisms for consensus building will aid our ability to adapt to new economic realities.

### Recommendation 1.3 Build Organizational Structures That Allow Change

Organizations must have the capacity to react to changing circumstances as they occur.

> "...in order to seize the competitive edge, we must maximize the flexibility and adaptability of American workers and managers." (Foxen)

Management must pay attention to practices and institutional conditions which impair responsiveness. These include antagonistic labor/management relations, short-term profit orientation, bureaucratic structures, and the lack of incentives and mechanisms for worker retraining.

> "We must create a stimulating, supportive environment in which our employees can become the sensors and masters of change rather than its victims." (R. J. Boyle, Honeywell, Inc.)

To make maximum use of our work force requires leadership and organizational attention to "basics." For instance, we need to:

- develop long-term rather than short-term scenarios for deploying capital and human resources;
- accommodate individual employee differences with respect to hours of work, career paths, and job design, etc.;
- create new ways to continuously upgrade employee skills;
- insist on management practices which foster customer interaction at all levels; and
- reinforce individual accountability for results.

To meet the competitive challenge we must have responsive organizations that can evoke the best efforts of all employees. As John R. Stepp, U.S. Department of Labor, observed:

> "In our present internationally competitive environment the increased productivity and the increased flexibility to respond to economic and business conditions which can result from labor-management cooperation may well make the difference between jobs or unemployment for many American workers."

**John R. Stepp**
*U.S. Department of Labor*

**THEME 2.**

## *Make a Management Commitment to Quality and Productivity: Leading from the Top*

"We at Sony believe that quality and productivity are the responsibility mainly of management." (Sadami Wada, Sony Corporation of America)

By virtue of position, top management develops the motivation and attitudes and thus the basic direction for an organization. Management leadership is also necessary to insure that the chosen strategies are translated into effective action. Long-term planning provides a consistent set of goals against which continuous improvements can be made. Leadership, however, should not be confused with authority:

"Authority is position: leadership is style. One demands respect: the other earns it." (Malcolm Stamper, The Boeing Company)

### Recommendation 2.1 Build a Top Management Philosophy Committed to Quality/Productivity

"...lack of commitment from the top is the major impediment to getting a productivity program off the ground. If there is not action and demonstrated commitment from the president and/or CEO on down, forget it." (David Hamilton, Intel Corporation)

An organization is guided by its beliefs. These beliefs are the foundation upon which all policies and actions are based. One organization with such a credo is IBM. John Jackson of IBM discussed how Thomas Watson, Jr., stated that, to survive, an organization must have a sound set of beliefs, must adhere to these beliefs and:

"...to meet the challenges of a changing world, it must be prepared to change everything about itself except those beliefs..."

Use every opportunity to show visible management support. The message should be delivered through all available media. Charles Joiner, Jr., of the Mead Corporation suggests using formal employee meetings, videotapes, company brochures, newsletters and individual meetings as well as normal contacts in the course of day-to-day business. The commitment must be sincere, long-term and not be compromised by short-term considerations or crises.

"It is vital that top management make a true commitment to quality/productivity leadership...this commitment must be communicated to all employees, and reinforced through management actions and involvement. Make no mistake, employees can discern whether management is just paying lip service or is genuinely committed. If the Chief Executive Officer isn't committed, the employees won't be either." (John Manoogian, Ford Motor Co.)

**Malcolm T. Stamper**
*The Boeing Company*

**Charles W. Joiner, Jr.**
*Mead Corporation*



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**Lemmuel L. Hill**
*Naval Surface Weapons Center*

Quality and productivity goals often become slogans that are not reinforced through management policies. This must be corrected, since a manager's example speaks louder than words. While the President or CEO may be the most visible champion, the key considerations of any management team are working together effectively and "modelling" to the rest of the organization the values and skills that are desired. As Charles Joiner stated:

> "The leader is the architect of that vision and above all else he or she must be for employees—the shining example of permanent human aspiration—inspiring employees to devote their powers to jobs worth doing."

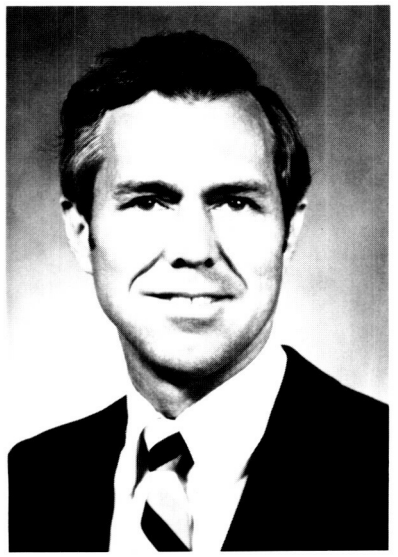
He further stated:

> "...our team was built through sheer hard work...Our first meeting was tough and full of game playing...We simply needed to develop the trusting relationships found in mutual friendships...In the process we learned some new skills...Once the team was functioning it was then possible to begin moving...(it)...down through the organization."

### Recommendation 2.2 Make Management's Goals and Long-Term Plans Known Throughout the Organization

As Lemmuel L. Hill of the Naval Surface Weapons Center stated: "organizational effectiveness...is heavily dependent on...two attributes...dedicated, capable people, and a sense of purpose and direction." Transmitting the quality/productivity goals resulting from long-term planning to all employees is one of the most necessary kinds of communication, but at the same time one of the most difficult. In the words of Charles Joiner:

> "Once the future has been determined, it must be shared with all employees through an intensive communication process."



**F. Blake Wallace**
*General Motors Corporation*

A clear and consistent view of the strategic direction of the organization must be communicated to all organization members. Organizations gain direction from a strategic vision and from the basic philosophies and values it embodies.

The need to lengthen time horizons was a persistent theme at the symposium. F. Blake Wallace points out how the long-term view affects capital investment decisions at General Motors:

> "The solution which we at GM are using, and I believe that others in the industry are applying, is not to abandon the ROI analysis, but to supplement it with a clearer picture of our aspirations for five, ten or even fifteen years in the future and make appropriate factory modernization decisions to reflect those aspirations."

Long-term goals are important not only for capital investment, but for human resource development and product planning as well. This theme was echoed by Rockwell International's Richard Foxen, who said business leaders need to return to the basics of providing leadership in the development of both capital and human resources.

## Recommendation 2.3 Develop Organizational Structures and Policies to Support Management Philosophy

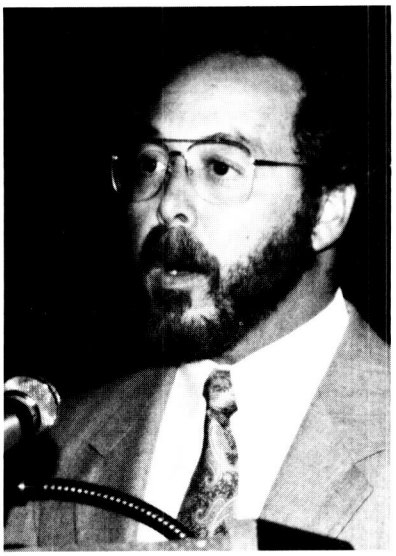
Make sure that promotion policies, compensation policies, planning and budgeting systems, information systems, and other systemic mechanisms are in alignment with strategic direction and organizational philosophy. The behavior of managers and employees is shaped in part by management's example and in part by organizational structure and systems.

> "To create a trusting work environment, the manager's behavior must remain consistent with the stated beliefs in people." (Joiner)

Joiner uses management systems as a way of assuring that managers' actions are consistent with stated beliefs. These include the compensation program, selection process, performance reviews, educational opportunities, "speak-up" programs, and systematic approaches to planning and budgeting. Regular surveys are designed and carried out periodically to assess organizational health and insure that systems are aligned with the strategic vision.

Often the most powerful media are not those usually associated with communications. Harvey Weiss of Digital Equipment points out that communication in Japanese firms is enhanced by job rotation. Japanese managers and engineers rotate through many parts of the organization during their careers. They know the people and the operations, thereby facilitating communication and coordination. Weiss also warns that:

> "...we may mistakenly encourage people to stray from the 'desired mission' of the enterprise through the structure, the measurement system or the reward system we put in place."



**Harvey L. Weiss**
*Digital Equipment Corporation*

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**Harvey L. Weiss**
*Digital Equipment Corporation*

**THEME 3.**

## *Mesh Goals and Responsibilities: Opening Two-Way Communications*

"In all organizations there are a number of prominent feelings or attitudes which the company stands for that influence how one should act in performing job assignments." (Fred A. Manske, Federal Express Corp.)

Communication in an organization is analogous to the nervous system of a human being: it provides the linkage between plans, behavior and actions. Thus, communication coordinates the joint actions of individuals, teams and departments. It is used to gain cooperation among different elements, to reward and recognize employees, and to convey information. In short, open two-way communications processes are essential to effective functioning.

Richard Kraft of Matsushita expresses well the relationship between organizational philosophy and communications:

"My experience has convinced me that a clear management philosophy can allow managers to be confident in their business activities, and guide managers to speak and act honestly with both customers and employees."

**Fred A. Manske, Jr.**
*Federal Express Corporation*

### Recommendation 3.1 Talk with Customers, Vendors and Contractors

Every level of your organization has "customers" and each should be attuned to these customer needs and desires. Lewis Lehr of the 3M Company describes how his company creates opportunities for both employee/customer interaction and vendor dialogue. These range from requiring officers of the company to spend one day a month selling the product, to user conferences involving face-to-face contact between designers and customers.

"Imagine what would happen if the designers of, say, an office machine had to spend one day a month in the field, making service calls or listening to customer complaints. What would happen if the people responsible for drafting regulations in an agency had to spend one day a month helping people fill out the forms and meet the requirements?" (Lehr)

John Manoogian reinforces this point and adds a new dimension:

"The customer is the final judge, so it is better to *determine needs from the customer's viewpoint*. . . The term 'customer' refers not only to the *external* purchasers of our products but also to our *internal* customers—the next person or organization in every stage of our business and manufacturing process."

If we are to improve quality and productivity, everyone, at every stage of the production process, must identify and listen to the customer. Encourage your vendors to communicate with you. Work closely with your vendors to identify and solve mutual problems. Establish mechanisms for regular interaction with your vendors. At Matsushita this takes the form of a mutually agreed upon quality improvement plan.

"This plan usually includes a system for rapid and accurate feedback between the company and vendor so that problems on either side can be identified and acted upon, suggestions for improvement can be exchanged and progress can be tracked." (Kraft)

**John A. Manoogian**
*Ford Motor Company*

**John A. Mittino**
*U.S. Department of Defense*

### Recommendation 3.2 Foster Government/Industry Cooperation for Mutual Benefit

More and more government agencies are reaching out to their contractors to enhance quality and productivity to the benefit of both. One notable example was related by Gerald Griffin of NASA's Johnson Space Center:

> "...in a series of workshops held last winter, we asked industry to give us their views on the major impediments to a more successful industry-NASA working relationship. And lo and behold, as a Walt Kelly comic strip character once put it so well: 'We have met the enemy, and they are us!' Our partners came back in short order and quickly pointed to a number of areas where we, NASA, presented stumbling blocks."

Such dialogue can lead to improved quality, shortened delivery schedules and reduced costs on government procurements. When coupled with incentive contracts, this can be a true win-win situation.

As an example of government's role in promoting this form of communication, John Mittino of the U.S. Department of Defense described steps being taken to encourage productivity-oriented capital investment by industry. This effort includes sharing productivity savings with subcontractors as well as prime contractors through the Industrial Modernization Incentives Program.

**THEME 4.**

## *Make Innovation Rewarding: Encouraging Innovation and Risk-Taking*

"...One essential step in renewing an organization is to set up a system for the care and feeding of innovators...a sponsor...proper awards...and the need to know what will happen to them if they fail..." (Lewis Lehr, 3M Company)

Organizations typically go through a life cycle. When they are young, they are characterized by flexibility and innovation, and are usually staffed by a group of people with a strong drive for success. As they expand and mature, organizations tend to become specialized and segmented. Informal dialogue tends to be replaced by a preoccupation with formal policy and control. Instead of designing for success, Lehr points out, mature organizations tend to be more concerned with avoiding errors. "Playing it safe" becomes paramount. George Seegers of Citibank, N.A., describes the fate of Central Leather, once the nation's 24th largest company:

"Central Leather failed to adopt new shoemaking techniques and equipment, and some time ago took its rightful place in the graveyard of companies that decided to 'play it safe!'"

Survival in today's economy depends on an organizational philosophy that nurtures risk-taking and innovation.

"...companies that take risks generally prosper. The *true* risk for any company is to believe that risk-taking is unnecessary for long-term growth and survival." (Seegers)

**Lewis W. Lehr**
*3M Company*

### Recommendation 4.1 Provide a Climate for Creativity

Lehr identifies three considerations in the care and feeding of innovators. First, they need a sponsor who can help obtain resources and shield the project if it falters. Second, innovators should be appropriately rewarded according to individual values. IBM's Corporate Fellows Program provides one example. Fellows are free to roam the company to select problems that interest them. The third consideration is the cost of failure. Innovators must be assured that failed projects will not cost them their jobs.

Harold Edmondson of Hewlett-Packard describes a supportive climate for innovation as one that allows people to be creative, challenges the person by providing progressively demanding creative experiences, provides direction for creative energy, provides measures for assessing success, and provides tangible rewards, e.g., status, resource support and peer awards.

"Zealous volunteer champions. Innovators. Quite simply, they are *the key* to renewal in an organization. And we don't even need to look for them. They'll find us if we let them." (Lehr)

**Harold E. Edmondson**
*Hewlett-Packard Company*

**John J. Franke, Jr.**
*U.S. Department of Agriculture*

### Recommendation 4.2 Recognize the Place for Risk-Taking

Innovation is not equally applicable or desirable in all parts of an organization. Furthermore, innovation is frequently accompanied by risk and additional costs. Management must therefore decide when these risks and costs are warranted by the potential gains. As Seegers points out:

> "The first lesson to be learned is that you must have a detailed, well thought-out template... for reaching your objective. The second is that you have to know when to follow the plan, and when to ignore parts of it... What every large organization—and especially the government—needs is periodic reviews of all activities, just to make sure that an obvious, somewhat risky, but better way of doing things is not being overlooked."

The timing of innovation is also important. Should the focus be at the early stage of a process, a later stage or should one strive for innovation throughout the process? The answer can be derived only from a well thought out business strategy which explicitly addresses the areas in which innovation in product or process is appropriate. John Franke of the U.S. Department of Agriculture had an interesting point of view on the benefits of some risk-taking.

> "Stirring the pot upsets and causes some disruption. But we feel the disruption is worth it. It provides the energy for new approaches and new methods."

**THEME 5.**

## *Build Dedication, Pride and Team Effort: Promoting Participative Management*

"The spirit of entrepreneurism may start at the top, but it is the middle levels where the attention to detail and commitment to quality make or break an entrepreneurial dream." (George Seegers, Citibank, N.A.)

Organizations that face strong competitive and budgetary challenges are forced to make full use of all resources. Although most organizations give lip-service to the slogan that people are their most important resource, management actions often tell a different story. Many employees are inhibited from making contributions to quality and productivity because they are not encouraged by management to participate in planning for improvements, problem solving, and other work-related decisions. Nevertheless, employees on the shop floor, in the office areas, and at various levels of management are extremely knowledgeable about their work and are aware of task-related problems.

Employees who are allowed to participate in decision-making have a commitment to make those decisions work. Participation gives an employee the opportunity to learn and master the environment as well as the chance to be recognized for making a contribution.

"Forty-one thousand suggestions, 17 thousand adopted. $52 million saved. People just naturally become more productive when they are given something to live for, work for, and hope for." (Malcolm Stamper, The Boeing Company)

**George E. Seegers**
*Citibank, North America*

### Recommendation 5.1 Make a Long-Term Commitment to Participative Management

"The basic philosophy behind our way of doing things is to recognize that the employee on the job is often the best fitted to give advice about how to do that job... Just being involved in carrying out the tasks of a company without ever having a voice in the development of its policies or procedures is not sufficient participation." (John Felton, McCormick & Co.)

The journey toward a participative organization begins with a clear commitment to the philosophy of involving people as a "way of doing business." This commitment must start at the top, representing a long-term dedication which is conveyed in words and is in accord with the organizational structure and systems.

The Dana Corporation management explains its company philosophy, "The Dana Style," in a handout given to all employees:

"The people of Dana, who are doing the job, know best how it should be done and they share the responsibility to decide what their job is, and to judge how well it is done." (Carl Hirsch, Dana Corporation)

**John W. Felton**
*McCormick & Company, Inc.*

**Jack Sheinkman**
*Amalgamated Clothing & Textile Workers Union*

In a unionized environment, the commitment to participation will necessarily involve the joint actions of management and labor and may be institutionalized through the collective bargaining process. In order to succeed, however, according to Jack Sheinkman of the Amalgamated Clothing and Textile Workers Union, union and management must view each other as equal partners in a long-term effort. He further notes that contractual agreements must include an explicit provision that the productivity improvement program will not lead to layoffs and will neither undermine nor supplant collective bargaining, but rather extend the process.

### Recommendation 5.2 Build Supportive Management Structures and Policies

There is a wide range of employee involvement techniques: e.g., suggestion systems, quality circles, multiple-management, labor management committees and employee stock ownership plans. The particular form chosen to elicit employee participation does not appear to be as important as the fact that some structured process exists and that the process enjoys a broad base of support among those affected. Participative processes are implemented in accordance with the unique characteristics of each organization; there are no formulas or ready-made programs to guarantee success.

Mechanisms that encourage the flow of communication to upper management tend to increase commitment to the job and promote high levels of motivation.

> "More than anything else, quality or excellence stem from the people of an organization: their motivation, their drive, and most importantly, the way they relate to one another." (John Jackson, IBM)


**John B. Jackson**
*IBM Corporation*

Once the commitment has been made to move toward a more participative organization, a supportive management structure must be put into place. According to Charles Joiner, Mead Corporation, this may mean reducing the levels of management, broadening the span of control and reducing staff:

> "It is important to entrust a person with the job and then trust him/her to do it without unneeded bureaucratic red tape or management hierarchy."

In the early stages, participation alone may be enough to sustain a participative management style. In the long run, though, to sustain high levels of participation, organizations must make it clear to employees how the fruits of their participation are distributed.

> "Our stock purchase plan gets people to identify with Dana by making them owners of the company. Last year Dana people put out $17 million of their own money (along with $5 million in Dana's matching contributions) to buy 846,000 shares of stock." (Hirsch)

Other means of rewarding employees include bonuses, management recognition and enhancing status. Unfortunately, when organizations attempt to provide a more participative organizational climate, performance appraisal systems, promotion and compensation systems and other control systems may, unless modified, work in opposition to these goals. Management must periodically review these systems to ensure that they support participative management if this philosophy is to become institutionalized.

### Recommendation 5.3 Address the Concerns of Middle Managers

Over the long run, no participative management process can be sustained without the involvement and support of middle managers. What is this "middle management problem"? Throughout this report, we have discussed the need to involve top management in launching any quality/productivity effort. As David Hamilton from Intel put it:

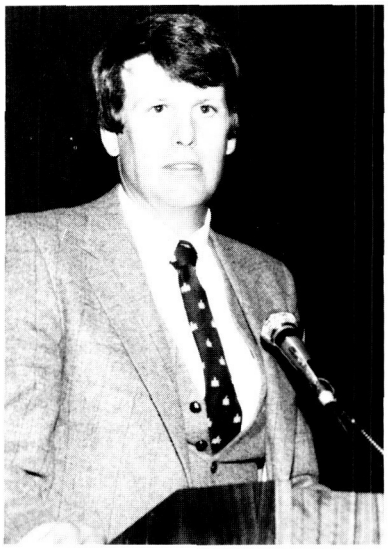
> "Senior management must set realistic goals for productivity improvement throughout. . . and be willing to hold middle management accountable for performance against these goals."

Gaining enthusiastic support among rank-and-file employees generally presents few problems. Unfortunately, the benefits to be derived from a productivity effort are not so readily apparent to middle management, for they tend to perceive themselves as being held accountable for a process over which they exercise little control. Moreover, middle managers may grumble that their role in the decision-making process has been usurped, at least until they become sufficiently involved in carving out a new role/relationship with employees.

One barrier to this support is lack of skill in operating in this "new" mode. McCormick and Company has solved this problem through a well-established program called multiple management. This involves giving middle managers a greater voice in running the business through the establishment of "junior" boards of directors.

> "The result at McCormick was small teams of employees meeting regularly on a voluntary basis to identify, to analyze, and to solve work-related problems—real company problems involving packaging, product development, productivity, cost reduction, distribution, sales, quality and inventory control." (Felton)

When introducing participative management processes, considerable effort should be devoted to identifying and confronting the fears and concerns of middle managers. For example, is it realistic to expect middle management support if top management does not allow middle managers to participate in decisions that affect them?



**David J. Hamilton**
*Intel Corporation*

**THEME 6.**

## *Uncork Individual Talent: Controlling Bureaucracy*

> "Pushing responsibility to the farthest points of the organization is the best way to make entrepreneurism a reality." (Carl Hirsch, Dana Corporation)

Organizational barriers that inhibit entrepreneurism need to be broken. The true purpose of an organization is to support the individuals within it so they can be responsive to the organization's goals and be innovative and effective. Experience has shown that as successful organizations mature there is a tendency for bureaucratic symptoms to begin to erode the organization's effectiveness. Typically, it becomes preoccupied with controls and checks that are narrowly focused, parochial and inflexible. This maturation process, if unabated, leads to organizational decline as it loses the ability to adapt to the needs of the customers and meet the challenges of technology and the growth of competition.

> "In any organization, the inertia is on the side of those who play it safe. . . Bureaucracy begins when people are less concerned with being right than not being found wrong." (George Seegers, Citibank, N.A.)

Government laws, rules and regulations also have impeded the ability of organizations to remain flexible and adapt to change.

**Carl H. Hirsch**
*Dana Corporation*

### Recommendation 6.1 Increase Employee Initiative Through Decentralization

F. Blake Wallace describes how GM is dealing with the bureaucracy issue:

> "Decentralization is what our new GM organization is all about. We've got to move faster in designing new products and bringing them to market. We've got to cut out bureaucracy, eliminate redundancy, and make more efficient use of our people. And probably most important of all, we've got to uncork individual talent. . . by giving our people the opportunity to take risks, assume responsibility. . . and earn rewards." (Wallace, quoting General Motors Chairman Roger Smith)

It is possible for management to thwart the bureaucratic symptoms of maturing organizations through decentralization and by providing greater freedom for the innovators. Managers must examine the given tasks and structure of an organization in such a way that the people who are supposed to make it work have the best chance to do so. The danger can be in placing people in various slots simply because it supports some form of an organization, whether it is effective or not. Often in bureaucracies performance at lower organizational levels is hampered by the need to check with multiple layers of management before a decision can be made. This stifles individual motivation, initiative and creativity. Arlene Triplett of the U.S. Office of Management and Budget describes a government field manager's frustration:

> "One of the problems with productivity in the government is that the poor guys out there in the field trying to deliver services to the taxpayers have to go through five and six layers of management before they get simple decisions like, 'Can I replace my secretary? Can I buy a file cabinet?'"

**Arlene Triplett**
*Office of Management & Budget*

**Gerald D. Griffin**
*NASA Lyndon B. Johnson Space Center*

### Recommendation 6.2 Resist the Tendency to Overregulate and Provide Incentives for Productivity Improvement

> "For all the tools we have tried and texts we have studied, the real secret to improved productivity in our society is that simple but all elusive commodity, plain old fashioned *trust*—confidence in people and faith in their integrity." (Malcolm Stamper, The Boeing Company)

An example of overregulation in the Federal procurement process was discussed by John Mittino, who described the Department of Defense's efforts during the last three and a half years to improve productivity with its contractors. This effort began with 32 initiatives to shorten and simplify the acquisition process. At the present time priority is being given to six management areas which Mittino says provide the greatest challenge and the greatest potential payback. These areas include: program stability, multi-year procurement, economic production rates, realistic budgeting, support and readiness, and competition.

Another example of continuing DoD efforts to enhance contractor quality and productivity is through the use of contract incentives in its Industrial Modernization Incentives Program. NASA also is using the contractual process to encourage improved contractor performance.

> "Incentive contracts have always been our primary tool to motivate business in the R&D environment. We are now placing increasing reliance on this controversial tool to focus on developing even more innovative and cost-effective ways of doing business." (Gerald Griffin, Johnson Space Center)

Griffin further stated that 15-year contracts were planned to give contractors the opportunity to introduce long-range improvements. Later on, a fixed-price contract is envisioned to inject greater productivity and cost consciousness incentives. These new contracts will allow NASA to delegate extensive management responsibilities to the contractor as NASA reduces its day-to-day involvement in operations support.

In his review of initiatives undertaken by the President's Commission on Industrial Competitiveness, Executive Director Egils Milbergs outlined some components of a recently passed bill which will "modify the antitrust laws to permit precompetitive R&D ventures." A central goal is to reduce paperwork and costs for industry and government.

**THEME 7.**

## *Modernize for Survival: Encouraging New Technology*

> "Effects of technology are not instantaneous, but there is a competitive imperative to use the most productive technology available. . . most of foreign competition strength is application of the newest technology." (Fred Garry, General Electric Co.)

New technology is making inroads on all fronts—office automation, new manufacturing equipment and innovative processes. New products appear daily and one company's new product becomes part of the next company's new process.

Office automation, the technology with the greatest impact on white collar productivity, has taken hold in the United States at a much faster pace than factory automation. In general, the equipment costs less, it can be introduced piecemeal, and most important, the fundamental technologies are already available. Any organization with a desire to automate office procedures can find a reasonable selection of affordable equipment on the market. Experience has indicated sizable savings. F. Giannantonio, Avon Products, noted a positive return on investment in just one year.

> "We measured indirect savings on productivity gains of 23 percent for management/professional staff and 53 percent for our secretarial/administrative staff."

But new technology means more than a way to do something faster or cheaper. It means social change and changes in the way work is organized and managed. Obtaining the full benefits of technology requires cooperation.

> "Once the employees, their unions, and our management team joined hands, that new technology really began to pay off." (Garry)

### Recommendation 7.1 Plan for the Technical and Social Impact of Technology

Careful planning is necessary to insure that the potential benefits of new technology are realized. These plans must not only address changes in work methods and procedures, but also in how work is organized and managed, and how employees who operate and maintain equipment will be affected.

In older plants, according to Garry, successful introduction of new technology requires open, honest, two-way communication between management and employees and a commitment to retraining. In G.E.'s experience, many low-skilled workers have been successfully trained to handle high-technology jobs, thereby minimizing worker dislocation.

**Frederick W. Garry**
*General Electric Company*

**Frank Giannantonio**
*Avon Products, Inc.*

**William G. Pfeiffer**
*ITT Telecommunications*

In white collar organizations, information technology will dramatically alter patterns of social interaction and access to information. This will lead to power shifts in the organization that could have profound consequences if not anticipated. William Pfeiffer of ITT discussed the "electronic cottage" concept, an extreme case of decentralization. Stimulated by the increased power and portability of computers, people will be able to work in their homes or other locations physically separated from the central organization. Widespread application of this concept will not only alter work practices but will create major organizational and even societal changes.

> "Clearly, we're in for some profound changes, in both technology and office life... We must rethink our procedures and organizations." (Pfeiffer)

### Recommendation 7.2 Stimulate Modernization Through Government Support and Incentives

Government has played an important role in the technology introduction process and should continue to do so. John Mittino described DoD's manufacturing technology program aimed at introducing new technology into the production environment. He stressed the importance of current DoD initiatives designed to share dollar savings resulting from a defense contractor's productivity-oriented capital investment, through efforts such as its Industrial Modernization Incentives Program.

**Willie C. Livingston**
*General Dynamics*

The impact of such programs can be seen in success stories like that of General Dynamics, manufacturer of the F-16 fighter. Willie Livingston of General Dynamics cited technology-based productivity improvements that have reduced the number of man-hours required to build an F-16 from 110,000 in 1979 to less than 30,000 in 1983. Overall, the F-16 program, stimulated by government incentives, will produce savings to DoD in excess of $1 billion.

Robert Walquist of TRW, Inc. gave another example of government/industry cooperation. He described the joint efforts of NASA and TRW to make the Gamma Ray Observatory spacecraft program a model for more productive ways of doing business. The program has already implemented a series of productivity macro-goals to lead company, sub-contractor and individual employee productivity increases. TRW's efforts cover both team building and the use of new technology. With the use of mini computers they have developed a common government-contractor database which has reduced the need for reporting. Through video conferencing they have increased communications and reduced travel costs.

**Robert L. Walquist**
*TRW Inc.*

### Recommendation 7.3 Maximize Computer-Related Technology

White collar operations in industry and government are benefitting from computer/communications technologies. In aerospace firms such as Lockheed Missiles and Space Company, computer-aided design and manufacturing (CAD/CAM) are increasingly viewed as a means of reducing the labor content of products and improving product quality. In the future, these technologies will provide a way to cope with a projected shortage of skilled engineers and technicians. Lockheed's Fred Oder reported productivity savings from CAD ranging from 36 to 73 percent when compared to the cost of manual design.

While advances in office automation are occurring daily, the major office productivity breakthroughs have not yet occurred. Major gains await improved component compatibility and the convergence of computer and telecommunications technologies. William Pfeiffer of ITT points to three main concerns and needs of users that must be satisfied if office automation is to fulfill its promise. First, there is a need for easily understandable software triggered by English language commands. Second, the user needs an integrated package of hardware, software and communications technology. And finally, the most difficult need to satisfy is the standardization of system architecture. Knowledgeable managers can influence hardware and system vendors by communicating these requirements. Until these needs are met, the office automation contribution to quality and productivity improvements will continue to be less than optimum.

> "The office of the future has not yet arrived...the technologies necessary to create it have been around for about ten years...What's missing is the "glue"—the systems architecture that allows equipment from different vendors to work together...In other words, we have an electronic Tower of Babel." (Pfeiffer)

**Frederic C. E. Oder**
*Lockheed Missiles & Space Company, Inc.*

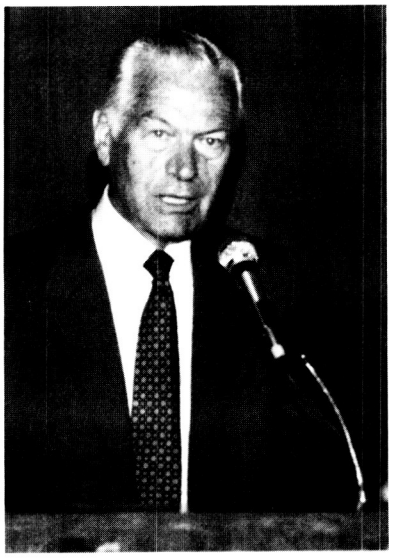
**THEME 8.**

## *Maximize Human Capital: Developing Strategies to Improve Education and Training*

"Human capital is our most valuable national resource. It is insufficient to try to discuss productivity without discussing education which defines and develops the quality of human resources for the future." (Owen B. Butler, Proctor & Gamble)

Improvement in national productivity and competitiveness depends on the training, education, and social conditioning of our most important national resource—our people. Over the past several years business and government leaders have noted a decline in the basic preparation of our young people to meet the diverse challenges and complexities of our fast-changing society. Blame is commonly put on the public school system, but family, school, the community, government and industry must all share responsibility.

According to Butler, industry spends approximately $30 billion annually on remedial and continuing education to make up for educational deficiencies in its work force. Schools, from the primary grades through college, must consider how to adapt their curricula, not just to the ever-changing job market, but equally important, to an ever-changing society. In this effort, the family, community, government, and industry, each have roles and responsibilities in guiding schools and motivating and educating young people for more productive lives. Each group must bear the responsibility and give it high priority.



**Owen B. Butler**
*The Proctor & Gamble Company*

### Recommendation 8.1 Inform Educators of Required Job Skills

In the past, new employees entering the work force generally worked at low skill tasks on narrowly defined jobs that were relatively easy to learn. Today, employees are required to perform a broad range of tasks. They are expected to operate and maintain equipment, perform administrative tasks, participate in goal-setting and budgeting, and work in groups and teams that are self-directed and guided by principles rather than detailed procedures. Even people with strong educational backgrounds require a large amount of training to perform in this situation.

However, employees who lack a strong foundation in literacy, numbers skills and, above all, the ability to learn, require even more training. Industry should bear the responsibility for specific job training, but our educational system must provide students with the basic skills required for employability in today's business environment.

### Recommendation 8.2 Encourage Increases in the Number of New Scientists and Engineers

Industry should work closely with colleges to insure that scientists and engineers receive broad training and provide incentives that will attract them to manufacturing careers. The United States is falling behind in the number of new scientists and engineers compared with our competition.

"In 1982, engineering and science accounted for only 20 percent of all bachelors degrees earned in the United States. This compares with 25 percent of all such degrees earned in Japan; 34 percent in West Germany and more than 50 percent in the Soviet Union." (James M. Beggs, NASA)

**Robert E. Cole**
*University of Michigan*

Robert Cole of the University of Michigan notes that we not only have fewer technical people, but we deploy them in ways that may be adverse to our overall economic competitiveness.

> "...Many of our most talented researchers and engineers have been siphoned off into the defense and aerospace industries. ...As I visit Japanese companies, I am struck by just how many engineers they have to throw at fairly mundane technical problems... Japanese technical personnel working directly in the consumer products industries have been able to generate improvement after improvement, resulting in reduced costs, higher quality and productivity."

Cole also points out that the training and career progression of engineers and technical support personnel in Japan give them a competitive edge. In particular, our nation is weak in the area of technical support people. In Japan, high school graduates are given extensive in-house technical training, allowing them to assume many engineering tasks. This frees up graduate engineers to work on more complex tasks. Our nation's weakness reflects the weak technical background of high school graduates and inadequate training and career path planning in industry. As a result, we are not developing and retaining individuals with the required competencies as well as we should.

### Recommendation 8.3 Continue Training Employees for New Technology

Changes in process technology are occurring at an accelerated pace as industries attempt to remain competitive. This means that employees must continually learn new skills in order to keep pace. As one example, Butler observed that the only thing in its disposable diaper line that hasn't changed in the past 20 years is the name of the product! Manufacturing technology has changed and computers have replaced electrical relays for process control. In another area, employees who used to stack paper towel products now program a robot that performs the stacking. Office employees are experiencing changes in technology that are almost as dramatic.

An organization that values its work force and seeks to maintain stable employment must devote considerable time and effort to training.

> "To keep pace with these changing work place demands we must invest 7-10 percent of employees' time in training. That's an investment of up to $3,000 per year per employee in wage dollars alone. Clearly, when we invest that kind of money, we want to make sure that we get a proper return. We have to have employees who have the ability to learn and use their training." (Butler)

**THEME 9.**

## *Improve Quality/Productivity Practices: Building a Quality Ethic*

> "The whole measure of our success... will boil down to quality performance. Shoddy workmanship, defective materials, inadequate quality control, cash overruns—all can be improved or eliminated." (James M. Beggs, NASA)

For industry, the stakes in building a quality ethic are customer satisfaction, cost competitiveness, and ultimately, survival. At IBM no level of defect is acceptable. John Jackson of IBM states: "More than anything else, quality or excellence stems from the people of an organization... and quality is everyone's job... Our total quality costs are roughly 15 to 40 percent of the revenue stream." For government, the penalties for failed quality are cost overruns and missed supplier milestones. A quality ethic should permeate every aspect of an organization, starting with hiring the best people and then challenging them to top performance.

> "In contrast to just the traditional emphasis on profits, costs, and production goals, leadership has to become obsessed with making sure all decisions are driven by quality improvement, customer satisfaction and building an innovative team environment." (David Braunstein, NASA)

In these comments from his welcoming address to symposium attendees, David Braunstein, Director of NASA Productivity Programs, stressed the underlying mandate to instill the quality ethic in any organization. As such, the pursuit of quality and productivity is more an attitude, and not a program goal per se.

**James M. Beggs**
*NASA*

### Recommendation 9.1 Make Quality a Total Management, Employee and Supplier Commitment

As top management sets organizational goals so the quality ethic is driven by these goals. Leadership must transcend the narrow perspective of quality in technical terms to one which perceives quality as tantamount to organizational survival. Management must translate quality goals from the abstract, slogan level and relate them to all aspects of employee performance. Quality and productivity are consistently described as different sides of the same coin. This means that employees have to see their jobs not only in terms of "getting the product out" but also in terms of meeting top quality goals. Within an organization this involves how organizational elements cooperate and satisfy each other. Outside the organization it involves the relationship and dealings between customers and suppliers.

> "Our managers, supervisors and foremen are thoroughly educated in the policy that quality is the very life of Sony products... They are trained in the field to understand how important quality is for sales and after-sales service." (Sadami Wada, Sony Corporation)

**Sadami Wada**
*Sony Corporation of America*

Cooperation between a company and its vendors and suppliers is viewed as a major contributing factor to the high quality levels attained by Japanese manufacturers. Instead of responding to peremptory demands for higher quality, Japanese vendors establish mutually agreed-on targets for improvement as part of a quality plan. This features rapid, two-way feedback for generating suggestions, problem identification and solution and structuring a system for tracking progress.

The importance of this relationship is the basis of current DoD initiatives described by John Mittino. Since quality has become such a significant issue in the acquisition process, DoD, as the customer, is reemphasizing policies and programs aimed at promoting improved quality practices by contractors.

> "The Department (DoD) encourages commitment from top management and is promoting increased awareness and attention to quality problems during design and manufacturing. DoD is also re-examining its qualification and certification programs to determine whether quality is sufficiently stressed. Perhaps most importantly, we are trying to find new ways to include quality history in our source selection process." (Mittino)

### Recommendation 9.2 Incorporate Quality Goals into All Organizational Activities

**Richard J. Boyle**
*Honeywell, Inc.*

Quality goals must be understood in terms of the work that an organization performs, the process by which the work is performed and the management system under which the organization is run. As Richard Boyle of Honeywell has stated:

> "When we talk about quality, we're not just talking about products. We're talking about three elements that must be present. . . quality of work, quality of work life and quality of management."

Specific goals must be established for all three elements. Quality of work is what most people mean when they speak of quality. Does the product or service meet the requirements? Is it satisfactory to the customer? This analysis involves all individuals and functions of the organization.

Quality of work life is the degree to which the work environment allows and motivates employees to contribute to the success of the organization. Does the environment offer challenge, responsibility and appropriate rewards? Boyle observes that:

> "Quality of management is the key to sustained quality improvement. It involves fostering leadership that has the technical and intellectual skills to set the course for the organization."

The successful translation of quality goals into an organization's activities begins when employees can answer the question, "What is *my* job?" The job should be defined in terms of both the goods or services produced and the needs of the "customers" who receive them. When employees can answer this question, the organization can then focus on quality goals to increase its effectiveness. Without quality goals and a plan for achieving them in all organizational activities, we cannot develop a process for continual improvement.

> "The more effective approach has been to establish a quality improvement plan. . . The plan usually involves a system for rapid and accurate feedback. . .(so that) suggestions for improvement can be exchanged and progress can be tracked." (Richard Kraft, Matsushita)

### Recommendation 9.3 Assess Organizational Activities and Processes As Well As Bottom Line Results

People and processes provide the conditions for quality improvement, which is the driver for productivity. As viewed by Carl Hirsch of Dana Corporation:

> "The pursuit of quality is never finished, because the capacity of our people to produce quality is virtually unlimited. That's why we at Dana will not stop evolving and striving. . . .It may be good—but excellence is never really enough."

Management must continually strive to improve the quality of its products, as well as the capabilities of its processes. Responsibility rests with all levels of management to review these processes and determine, through analysis, what they contribute to the bottom line. These reviews must be conducted at key points and be based on facts. Moreover, these reviews should focus on defect prevention.

> "Screening by rejection only increases cost. Therefore, efforts must be made to manufacture right the first time. This is the real quality control. You must be able to obtain the desired level of quality with the least waste." (Wada)

Richard Kraft recommends following the Japanese example of accepting the quality teachings of Dr. W. Edwards Deming, Dr. J. M. Juran and others. The Japanese have accepted the premise that superior quality leads to competitive success, costs little and creates a worldwide demand for goods because of their reputation.

**Richard A. Kraft**
*Matsushita Industrial Company*

**APPENDIX A**

## *Symposium Program and Speakers*

*Tuesday / 25 September 1984*

8:00 AM — Registration

9:00 AM — Opening Remarks
**David R. Braunstein,** *General Chairman and Director, NASA Productivity Programs*

9:20 AM — Welcome
**James M. Beggs,** *Administrator, NASA*

9:45 AM — Break

10:15 AM — "Committing to Excellence"
**James M. Beggs,** *Administrator, NASA*

11:00 AM — "Management Philosophies Associated with Leading a Successful Organization"
**Malcolm T. Stamper,** *President, The Boeing Company*

11:45 AM — Room Assignments and Afternoon Activities
**A. Lawrence Guess,** *Chairman, AIAA Coordinating Group and Director, Commitment to Excellence, Martin-Marietta, Baltimore Aerospace Division*

12:00 NOON — Luncheon

Presentation by the crew, Shuttle Mission 41-D
(First flight of the Orbiter *Discovery*)

Introduction
**Gerald D. Griffin,** *Director, NASA Lyndon B. Johnson Space Center*

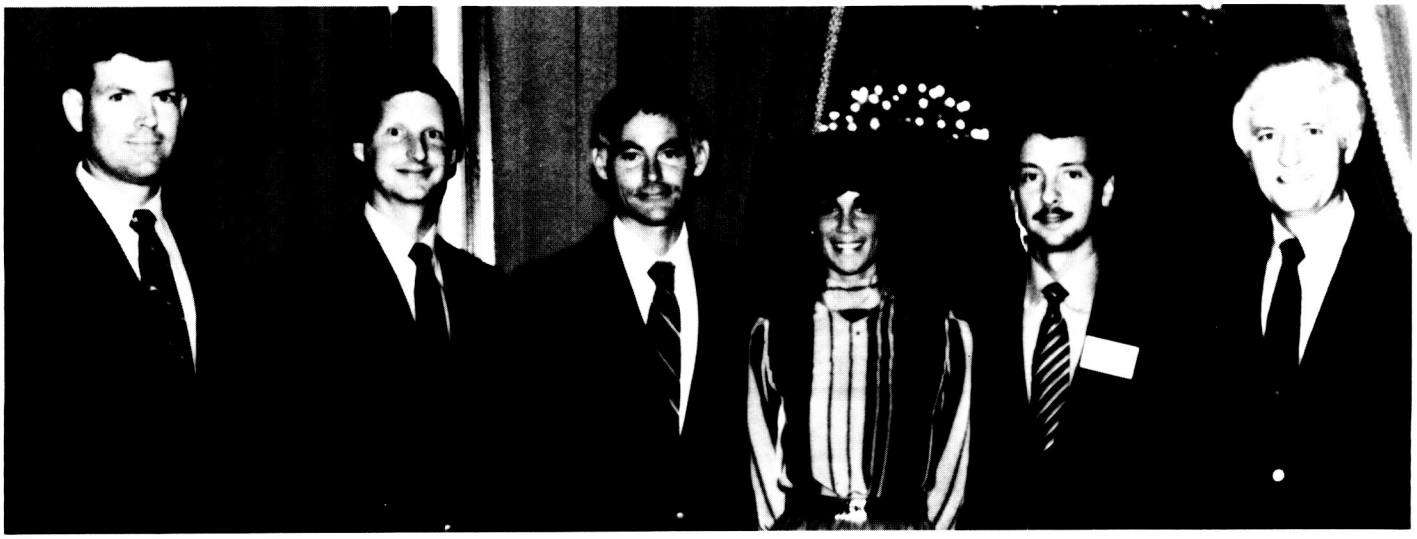
1:30 PM — ***Session A / Challenges and Problems***

Session Co-Managers

**C. Robert Nysmith**
*Associate Administrator for Management*
*NASA*

**Richard L. Engwall**
*Manager*
*Systems Planning, Analysis Assurance*
*Westinghouse Electric Corporation*

AIAA Coordinator
**George J. Vila**
*Consultant*
*General Dynamics Corporation*



**41-D NASA Shuttle Flight Crew**
*(left to right) Michael L. Coats, Steven A. Hawley, Richard A. Mullane, Judith A. Resnik, Charles D. Walker & Henry A. Hartsfield.*

***Session A / Challenges and Problems*** *CONTINUED*

► **Workshop A1: International Competition**

Chairman
**D. Bruce Merrifield**
*Assistant Secretary for Productivity, Technology and Innovation*
*U.S. Department of Commerce*

Coordinator
**Ronald H. Schack**
*Vice President*
*Business Development*
*Martin Marietta, Baltimore Aerospace Division*

"Understanding Changes in the U.S. Competitive Position: International Competitiveness"
**Robert E. Cole,** *Professor, Center for Japanese Studies, University of Michigan*

"Challenges Facing U.S. Industry"
**Richard W. Foxen,** *Senior Vice President, Strategic Management and International Rockwell International Corporation*

"Quality and Cost Competitiveness"
**John A. Manoogian,** *Executive Director, Product Assurance Ford North American Automotive Operations*

1:30 PM

► **Workshop A2: Organizational Attitudes and Orientation**

Chairman
**Laurence J. Adams**
*President and Chief Operating Officer*
*Martin Marietta Corporation*

Coordinator
**Z. Henry Hyman**
*Director*
*Engineering Business Management*
*General Dynamics Corporation*

"Some Informal Remarks on the M-Form Society"
**William G. Ouchi,** *Professor, Graduate School of Management The University of California at Los Angeles*

► **Workshop A3: Management Practices**

Chairman
**Ralph C. Bledsoe**
*Special Assistant to the President*
*The White House*

Coordinator
**Anthony J. LoFaso**
*Director of Programs—A18*
*Sperry Gyroscope, Sperry Corporation*

"Why Wrestle with Jellyfish?"
**Richard J. Boyle,** *Vice President and Group Executive Defense and Marine Systems Group, Honeywell, Inc.*

"Japanese Management in U.S."
**Richard A. Kraft,** *President and Chief Executive Officer, Matsushita Industrial Company*

"Are Incentives Right for U.S. White Collar Organizations?"
**F. Blake Wallace,** *General Manager, Allison Gas Turbine Division General Motors Corporation*

3:00 PM Break

3:20 PM

***Session B / Techniques for Improvement***

Session Co-Managers

**Richard A. Stimson**
*Director*
*Industrial Productivity*
*Office of the Under Secretary of Defense for Research and Engineering*
*U.S. Department of Defense*

**Edward G. Siebert**
*Director of Corporate Productivity*
*Grumman Aerospace Corporation*

AIAA Coordinator
**Peter W. Wood**
*Senior Vice President*
*Booz, Allen & Hamilton Inc.*

► **Workshop B1: New Trends in Management**

Chairman
**Alan M. Lovelace**
*Vice President*
*Productivity and Quality Assurance*
*General Dynamics Corporation*

Coordinator
**David Westerman**
*James Forrestal Memorial Industry Chair*
*Defense Systems Management College*

"Quality in Practice at IBM"
**John B. Jackson,** *IBM Vice President, Quality, IBM Corporation*

"Applying Productivity Principles to New R&D Programs, NASA/TRW GRO Project"
**Robert L. Walquist,** *Vice President and General Manager, Space and Technology Group TRW Inc.*

"Productivity Improvement in the Acquisition Environment"
**John A. Mittino,** *Assistant Deputy Under Secretary of Defense-Production Support U.S. Department of Defense*

3:20 PM

► **Workshop B2: Use of Technology**

Chairman
**Donald R. Beall**
*President and Chief Operating Officer*
*Rockwell International Corporation*

Coordinator
**Harold K. McCard**
*Vice President and General Manager*
*Avco Systems Division*

"New Technology Implications on the Work Force"
**Frederick W. Garry,** *Vice President, Corporate Engineering and Manufacturing General Electric Company*

"Modernization in Aerospace"
**Willie C. Livingston,** *Director of Productivity and Automated Office Systems General Dynamics Fort Worth Division*

"The Road from Babel: Prospects for Integrated Office Systems"
**William G. Pfeiffer,** *Director of Management Systems, ITT Telecommunications*

► **Workshop B3: Education and Training**

Chairman
**Dan Quayle**
*U.S. Senate (R-Indiana)*

Coordinator
**Eduard U. Clark**
*Program Manager*
*Electro-Mechanical Division*
*Northrop Corporation*

"A Corporate Perspective of the Adequacy of Human Capital"
**Owen B. Butler,** *Chairman, The Procter & Gamble Company and Vice Chairman, Board of Trustees Committee for Economic Development*

5:00 PM Reception

## *Wednesday / 26 September 1984*

8:30 AM — Welcome
**David R. Braunstein,** *General Chairman*

8:35 AM — Opening Remarks
**John L. McLucas,** *President, American Institute of Aeronautics and Astronautics*

8:45 AM — "Renewing Large Organizations"
**Lewis W. Lehr,** *Chairman and Chief Executive Officer, 3M Company*

9:30 AM — Break

9:50 AM — ***Session C / Renewing Large Organizations***

Session Co-Managers
**Brian Usilaner**
*Associate Director*
*National Productivity Group*
*General Accounting Office*

**Robert L. Vaughn**
*Director of Productivity*
*Lockheed Missiles and Space Company, Inc.*

AIAA Coordinator
**Joel M. Graybeal**
*Aerospace Engineer*
*ANSER*

► **Workshop C1: Organizational Approaches**

Chairman
**George F. Mechlin**
*Vice President*
*Research and Development*
*Westinghouse Electric Corporation*

Coordinator
**Bartley P. Osborne, Jr.**
*Chief Advanced Design Engineer*
*Lockheed-California Company*

"Counteracting the Stifling Effects of a Large Organization"
**Harvey L. Weiss,** *Vice President, Mid-Atlantic & South States Area Management Center Digital Equipment Corporation*

"Building Teams and Maintaining Trust"
**Lemmuel L. Hill,** *Technical Director, Naval Surface Weapons Center*

"Balancing Risk Taking and Encouraging Entrepreneurism"
**George E. Seegers,** *Vice President, Public Issues, Citibank, North America*

"Making the 'Z' Concept Work"
**Charles W. Joiner, Jr.,** *President, Mead Imaging Division, Mead Corporation*

► **Workshop C2: Encouraging Innovation**

Chairman
**L. William Seidman**
*Dean*
*College of Business*
*Arizona State University*

Coordinator
**Richard R. Brown**
*Head of Applied Physics*
*Boeing Aerospace Company*

"Encouraging and Maintaining an Innovative Work Climate"
**Harold E. Edmondson,** *Vice President, Manufacturing, Hewlett-Packard Company*

► **Workshop C3: National Initiatives**

Chairman
**Robert L. Fairman**
*Assistant Secretary for Administration*
*U.S. Department of Transportation*

Coordinator
**William T. Mikolowsky**
*Director of Business Development*
*Lockheed-Georgia Company*

"Preview of the President's Commission on Industrial Competitiveness"
**Egils Milbergs,** *Executive Director, President's Commission on Industrial Competitiveness*

"Labor-Management Cooperative Programs"
**John R. Stepp,** *Acting Associate Deputy Under Secretary*
*Bureau of Labor-Management Relations and Cooperative Programs*
*U.S. Department of Labor*

"Hurdles Stifling the Federal Manager's Ability to Improve Productivity"
**Arlene Triplett,** *Associate Director for Management, Office of Management and Budget*

"Productivity Initiatives at USDA"
**John J. Franke, Jr.,** *Assistant Secretary for Administration*
*U.S. Department of Agriculture*

11:50 AM Luncheon

Address
**Joseph P. Wright,** *Deputy Director, Office of Management and Budget*

2:00 PM ***Session D / Success Stories***

| Session Co-Managers | | AIAA Coordinator |
|---|---|---|
| **States L. Clawson** | **Arthur L. Welch** | **Dirk H. Lueders** |
| *Director* | *Director* | *Colonel, U.S. Army* |
| *Commerce Productivity Center* | *Product Assurance* | *(Retired)* |
| *U.S. Department of Commerce* | *Martin Marietta Aerospace Michoud Division* | |

► **Workshop D1: Employee Involvement**

| Chairman | Coordinator |
|---|---|
| **Roy A. Anderson** | **George A. Schlanert** |
| *Chairman and Chief Executive Officer* | *Director, System Integration and Laboratories* |
| *Lockheed Corporation* | *Douglas Aircraft Company* |

"Step Back into the Future: The History of Multiple Management"
**John W. Felton,** *Vice President, Corporate Communications*
*McCormick & Company, Inc.*

"Union and Management Joining Forces"
**Jack Sheinkman,** *Secretary-Treasurer, Amalgamated Clothing and Textile Workers Union*

"Sony Keeps High Quality and Productivity in the United States"
**Sadami (Chris) Wada,** *Vice President and Assistant to the Chairman*
*Sony Corporation of America*

► **Workshop D2: Management Involvement**

| Chairman | Coordinator |
|---|---|
| **John Carroll** | **James A. McAnally** |
| *Executive Vice President* | *Vice President* |
| *Communications Workers of America* | *Defense Systems* |
| *AFL-CIO* | *Martin Marietta Denver Aerospace* |

"Keeping the Bureaucracy in Check"
**David J. Hamilton,** *Senior Productivity Analyst, Intel Corporation*

"The Dana Style: Participation Builds the Climate for Productivity"
**Carl H. Hirsch,** *Vice President, Corporate Planning, Dana Corporation*

"Contractor and Government: Teamwork and Commitment"
**Gerald D. Griffin,** *Director, NASA Lyndon B. Johnson Space Center*

► **Workshop D3: New Technology Applications**

Chairman
**Richard D. Delauer**
*Under Secretary for Research and Engineering*
*U.S. Department of Defense*

Coordinator
**Martin N. Titland**
*Vice President, Space Products*
*Fairchild Space and Electronics Company*

"Paperless Office at Work"
**Frank Giannantonio,** *Director, Information Services, Avon Products, Inc.*

"CADCAM Productivity"
**Frederic C. E. Oder,** *Executive Vice President, Lockheed Missiles & Space Company, Inc.*

"Getting Organizations to Accept New Ideas/Technology: The Federal Express Experience"
**Fred A. Manske, Jr.,** *Senior Vice President, Ground Operations and Sales Federal Express Corporation*

4:00 PM ***Program Synthesis Panel***

Moderator
**A. Lawrence Guess,** *Chairman, AIAA Coordinating Committee and Director, Commitment to Excellence, Martin Marietta Baltimore Aerospace Division*

***Session A***
**C. Robert Nysmith,** *Associate Administrator for Management, NASA*

**Richard L. Engwall,** *Manager, Systems Planning, Analysis, and Assurance Westinghouse Electric Corporation*

***Session B***
**Richard A. Stimson,** *Director, Industrial Productivity, OUSDR&E U.S. Department of Defense*

**Edward G. Siebert,** *Director of Corporate Productivity, Grumman Aerospace Corporation*

***Session C***
**Brian Usilaner,** *Associate Director, National Productivity Group General Accounting Office*

**Robert L. Vaughn,** *Director of Productivity, Lockheed Missiles and Space Company, Inc.*

***Session D***
**States L. Clawson,** *Director, Commerce Productivity Center U.S. Department of Commerce*

**Arthur L. Welch,** *Director, Product Assurance, Martin Marietta Aerospace Michoud Division*

5:00 PM Adjournment

**APPENDIX B**

## *Acknowledgments*

The papers and presentations of the symposium speakers, listed in Appendix A, were used as the basis for writing the report. Many individuals from government, industry and the academic community contributed much of their time to writing, re-writing and improving the content and organization of this document.

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**David R. Braunstein**